

Nocardial pneumonia in an immunocompetent young female: a rare entity

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Abstract

Nocardia is a ubiquitous aerobic saprophytic actinomycete commonly present in soil and contaminated water. *Nocardia asteroides* is the predominant human pathogen. We report here a rare case of nocardial pneumonia that was wrongly treated as pulmonary tuberculosis for first few weeks. Lack of improvement led to further exploration of case with examination of bronchoalveolar lavage fluid and sputum samples with Gram stain, which gave the confirmatory diagnosis of *Nocardia*. It was further supported by culture of nocardial colonies on blood agar respectively.

KEY WORDS: Nocardial pneumonia, BAL fluid, Gram stain

Introduction

Nocardial pneumonia in an immunocompetent adult without any other systemic manifestation of *Nocardia* is an extremely rare entity. Portal of entry in humans is most commonly via respiratory tract. Pulmonary nocardiosis is the most common manifestation of *Nocardia*. Others are cutaneous and disseminated nocardiosis, which are more common in immunocompromised individuals. This report describes a case of nocardial pneumonia that was wrongly treated as tuberculosis for first few weeks as the clinical profile was mimicking tuberculosis and tropical countries such as India are hubs of tuberculosis. Diagnosis was confirmed by Gram stain of bronchoalveolar lavage (BAL) fluid and sputum, which showed typical appearance of *Nocardia* species, and subsequent culture of *Nocardia* on blood agar plates, which showed chalky white wrinkly nocardial colonies. Patient was

completely cured from the illness with oral trimethoprim/sulfamethoxazole (TMP-SMX) therapy of 6 months.

Case Report

A 26-year-old young woman presented with mild continuous fever and cough with expectoration for 3 weeks. A weight loss of 4 kg was also observed in last 1 month. On admission, temperature was 36.8°C, pulse 104/min, respiratory rate was 20/min and BP was 134/84 mmHg. The results of routine hemogram are shown in Table 1.

She was washerwoman by occupation, and there was no evidence of any chronic drug intake in the form of corticosteroids or other immunosuppressive therapy. No history of tuberculosis was present and patient was adequately vaccinated with BCG vaccine. Chest radiographs after admission revealed bilateral pneumonic consolidation [Figure 1]. Patient was put on antimicrobial therapy with β -lactams and macrolides but there were no signs of improvement clinically and radiologically even after 1 week of parenteral antibiotic therapy. On the basis of high index of clinical suspicion and unresponsiveness to antimicrobial therapy, she was put on intensive phase of antitubercular therapy (ATT). Patient showed no signs of improvement even after 2 weeks of ATT, so a planned fiberoptic bronchoscopy of the patient was carried out and BAL sample was taken and sent for Gram

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Table 1: Results of routine hemogram

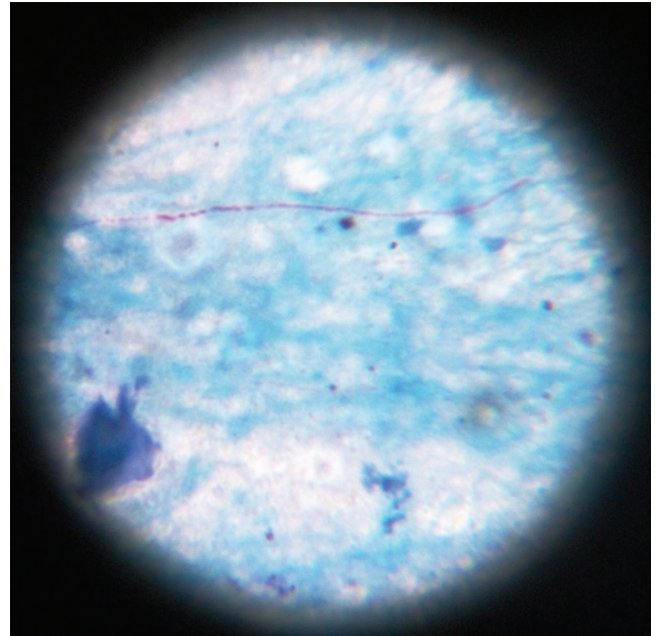
Parameter	Observation/Result
1. Sputum for AFB*× 2 samples	Negative
2. Tuberculin skin test	Induration 8 mm
3. Hb, TLC, ESR, PCV	10.6 g%, 15,300/mm ³ , 100 ml/h, 28%
4. AST, ALT, STP, Alb/Glob ratio	42 IU, 66 IU, 6.2 g, 3.6/3.0 g%
5. ELISA HIV, hepatitis viral markers	Negative
6. FBS, serum urea, serum creatinine	86 g/dl, 22 mmol, 0.9 mmol

*Acid fast bacilli. Hb, haemoglobin; TLC, total leukocyte count; ESR, erythrocyte sedimentation rate; PCV, packed cell volume; STP, serum total protein; AST/ALT, aspartate aminotransferase-alanine aminotransferase; FBS, fasting blood sugar; ELISA, enzyme-linked immunosorbent assay; HIV, human immunodeficiency virus

**Figure 1:** Chest X-ray showing bilateral pneumonic consolidation.

stain and culture. Modified ZN stain revealed typical picture of *Nocardia* as gram-positive rods with delicate beaded branching filaments [Figure 2].

On the basis of strong evidence in favor of nocardial infection and available drug-sensitivity pattern, the patient was treated with combination parenteral therapy of imipenem 500 mg (8 h once) and amikacin 15 mg/kg in two divided doses. Ceftriaxone was not given as the drug-sensitivity

**Figure 2:** Modified ZN stain showing typical picture of *Nocardia* as delicate beaded branching filaments.

pattern showed resistance to ceftriaxone. The patient showed significant improvement both clinically and radiologically, and symptoms of disease at the time of onset started resolving with substantial decrease in amount and purulency of sputum, and the patient became afebrile within 3 days of treatment with combination parenteral antibiotic therapy. The patient was continued on injectable antibiotics for 14 days and chest radiograph repeated at the end of parenteral antibiotic therapy revealed improvement as well. Subsequently, the patient was discharged after 34 days of hospital stay on oral TMP-SMX therapy. The patient persistently showed improvement in the form of weight gain and regression of constitutional symptoms pertaining to the disease. Chest X-ray was repeated after 1 month of hospital discharge, which showed complete resolution of pathological lesions from bilateral lung fields [Figure 3].

Oral TMP-SMX therapy was continued for 6 months to avoid relapse of the disease.

Discussion

Nocardia mainly affects immunocompromised patients mainly but seldom it can cause disease in immunocompetent individual, as was described in Curry's analysis of 455 cases in which 39% of these cases did not have a preexisting illness, trauma, or immunosuppressive therapy.^[1] Pulmonary manifestation of *Nocardia* ranges from pneumonia to lung abscess and empyema. Alcoholism and chronic lung disease are two important risk factors for pulmonary nocardiosis. The biggest challenge with nocardial infection is the difficulty to arrive at its



Figure 3: Chest X-ray showing resolution of consolidation after treatment.

definitive diagnosis due to scarcity of infection with this pathogen in immunocompetent hosts, as a result it is overlooked and mostly misdiagnosed as other pathology.^[2] Infection with *Nocardia* should always be suspected when there is a preceding history of contaminated water or soil ingestion and the patient is not responding to standard antimicrobial therapy; aspiration history cannot be ruled out in above case report as well. Gram staining of sputum and BAL samples is the mainstay of diagnosis for *Nocardia* where they appear as gram-positive branching filamentous rods. They grow readily over simple culture media such as blood agar and Lowenstein–Jensen agar. Therapy with oral TMP-SMX

remains the mainstay of treatment for *Nocardia asteroides* but due to emergence of resistant strains parenteral imipenem and amikacin are the drugs of choice for inpatients requiring parenteral antibiotic therapy. It is highly recommended that immunocompetent patients should be treated for at least 6 months with TMP-SMX therapy to prevent recurrence of the disease. The mortality rate due to nocardial infection is approximately 14–40%, which increases significantly with dissemination to central nervous system.^[3] About half of the pulmonary cases disseminate to extrapulmonary sites, most commonly to brain.^[4] We strongly emphasize on determining the species of *Nocardia* and its drug sensitivity pattern after culture to improve the outcome from the dreaded disease, which can be fatal otherwise.

Conclusion

We can conclude by saying that determining the species of *Nocardia* and its drug sensitivity pattern after culture is important to improve the outcome of the dreaded disease, which can be fatal otherwise.

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